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EXAMINER	
CERULLO, LILIANA P	
ART UNIT	**PAPER NUMBER**
2629	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/567,015	Applicant(s) ARIMOTO ET AL.	
	Examiner LILIANA CERULLO	**Art Unit** 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/05/2010 has been entered. In the submission, the Applicants amended claims 14 and 26. Currently, claims 14-26 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 14-16 and 23-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohi et al. in US 5,847,688 (hereinafter Ohi) in view of Matsushita in Japanese Publication JP2003-255908-A (hereinafter Matsushita), Greier et al. in US 2002/0149598 (hereinafter Greier) and Ikezaki et al. in US 5,489,917 (hereinafter Ikezaki). Please note that the English abstract provided in the IDS was used to support an explanation of the pictures in JP2003-255908-A.

4. Regarding **claims 14 and 25**, Ohi teaches a matrix-type display apparatus (Figs. 6, 7) which drives a display panel (LCD Panel Fig. 6) including a plurality of pixels (Fig. 7) disposed in matrix form (as shown in Fig. 7) and displays an image (col. 1 lines 11-22), comprising:

a converting portion (Fig. 6, elements 14-15) adapted to gamma-convert (Fig. 6, element 15) an input video signal (Fig. 6, RGB input signal 11), using n pairs of gamma-characteristics each made up of first and second gamma-characteristics (Fig. 6, elements 14-15, where three pairs are shown, each made of gamma-1 and gamma-2 for each one of R, G and B. Also note Fig. 5 where gamma-1 and gamma-2 are gamma curves i.e. gamma characteristics) different from each other (as shown in Fig. 5), the gamma-characteristics (gamma-1 and gamma-2 of Figs. 5-6) being a transmittance characteristic (col. 5 lines 25-39 and Fig. 2C where the gamma curves gamma-1 and gamma-2 are transmittance characteristics at different angles) according to an input level (Vin of Fig. 5); and

a selecting portion (Fig. 6, control 20) adapted to specify a transmittance (gamma characteristic of col. 5 lines 64-67) to be used for display (col. 5 lines 20-24 where the output voltage used for display of pixels in Figs. 6-7 has a specified [desired] gamma characteristic. Please note that specification of a transmittance, see Fig. 2C, results in a practical specification of a gamma curve according to viewing angle, see Fig. 5 and desired output voltage) based on the input video signal (Vin of Fig. 5 which is an input image signal per col. 4 lines 12-14), to select one pair of gamma-characteristics (gamma-1 and gamma-2 for either R or G or B in Figs. 6-7) from among the n pairs of

gamma-characteristics (three pairs shown in Fig. 6) according to the specified transmittance to be used for display (as explained above, the specified transmittance results in a specified gamma curve and output voltage of Figs. 2C and 5), and to select an output supplied to the display panel (Fig. 7) from among the 2n outputs (where 2n outputs are gamma-1 or gamma-2 for each RGB) which are gamma-corrected by said converting portion (Fig. 6, elements 14-15), so that a ratio between a first distribution area of pixels driven by the video signal gamma-corrected by use of the first gamma-characteristic of the selected pairs of gamma-characteristics (number of pixels driven by gamma-1 for either R or G or B in Fig. 7) and a second distribution area of pixels driven by the video signal gamma-corrected by use of the second gamma-characteristic of the selected pairs of gamma-characteristics (number of pixels driven by gamma-2 for either R or G or B in Fig. 7) is equal to a distribution area ratio specified in advance for the selected pairs of gamma-characteristics (Fig. 7 nth frame or Fig. 6 and col. 6 lines 53-59 referring to the first embodiment where adjacent pixel dots have different use different gamma conversion tables. Thus the ratio of number_of_red_pixels_with_gamma-1 to the number_of_red_pixels_with_gamma-2 is 1/1, and the same applies for green and blue) and with respect to a plurality of division of ranges (col. 5 lines 29-38 where one range is the upper viewing field of 10 degrees, and a different range is the lower field of 10 degrees) each division range being different (+10 degrees or -10 degrees) and set by dividing a range of transmittance to be used for display (col. 5 lines 29-38, the range of transmittance are all degrees of viewing angles in the up and down direction. As evidence that different degrees of viewing angles have different transmittance, the

examiner cites Ikezaki's Fig. 7, where different viewing angles have different transmittances. Therefore, when Ohi sets an upper viewing angle of 10 degrees and a lower viewing angle of 10 degrees, inherently Ohi is dividing a range of transmittance per Ikezaki's Fig. 7, and each division range is different as shown in Ikezaki's Fig. 7).

Ohi fails to disclose the n pairs of gamma characteristics being different from each other (Three pairs each of gamma 1 and gamma 2, one pair for each R, G and B. The pairs are the same as shown in Fig. 6), and according to the transmittance to be used for display, a different pair of gamma-characteristics and a different distribution area ratio are used.

However, Matsushita discloses different pairs of gamma characteristics (Matsushita. Fig. 1, three pairs each for a different color: Rγ1 and Rγ2, Gγ1 and Gγ2, Bγ1 and Bγ2. Also see Fig. 11 two pairs for either video or still image: γ1 and γ2, γ1' and γ2'), and according to the transmittance to be used for display, using a different pair of gamma characteristics (Matsushita, Abstract and Figs. 1 and 11. Where the transmittance to be used for display can be interpreted as either the transmittance of either R, G or B in the input signal, and a different pair of gamma characteristic Rγ1 and Rγ2 for red, Gγ1 and Gγ2 for green, Bγ1 and Bγ2 for blue is used as shown in Fig. 1. Or, the transmittance can be interpreted as the transmittance of the input image to be used for the display as either moving image or not, and a different pair of gamma characteristics γ1 and γ2, γ1' and γ2' is used as shown in Fig. 11).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have n pairs of gamma-characteristics being different from each

other (as taught by Matsushita in Figs. 1 and 11) and use them according to the transmittance to be used for the display (as taught by Matsushita in Fig. 1, 11 and the abstract) in Ohi's invention, in order to obtain the benefit of further improving the viewing angle depending of the image to be displayed, specifically in the case of moving image vs. still image where suitable control of each color may be required for better resolution (Matsushita, Abstract).

Still, Ohi in view of Matsushita do not teach using a different distribution area ratio according to the transmittance to be used for display.

Nevertheless, Greier disclose an LCD with improved viewing angle (Greier, para. 2) where some pixels are made brighter and some darker (Greier, para. 82 and Figs. 20-21 where the hatched pixels are dark and the white pixels are bright) and the distribution area ratio adapts to the image content (Greier, para. 85, where the distribution area ratio is the ratio of bright/dark pixels, and it can be e.g. 50% bright, 33% bright and others according to the image content). Thus, it would also have been obvious to one of ordinary skill in the art at the time of the invention, to use different distribution area ratios (as shown in Greier Figs. 20-21, dark vs. bright) according to the transmittance to be used for display (Greier, para. 82 referring to the image content) in order to obtain the benefit of further adapting the pixel data values in such way that the luminance is locally preserved in the image (Greier, para. 82) as regions of the image change (Greier, para. 85).

5. Regarding **claim 15**, Ohi in view of Matsushita, Greier and Ikezaki teach wherein a block comprises (n+1) pixels (from Ohi's Fig. 6, n=3, thus n+1=4, which would include 4 pixels of the same color, for example in Ohi's Fig. 7, first column, third column and two first rows, which are all red pixels will form a block of 4); and said selecting portion (Ohi, Fig. 6, control 20) selects an output supplied to the display panel (Ohi, Fig. 6, LCD panel) from among the 2n outputs (Ohi, Fig. 6, six outputs which are either gamma-1 or gamma-2 for either R or G or B. Also see Matsushita Fig. 1) which are gamma-corrected by said converting portion (Ohi, Fig. 6, elements 14-15), so that the ratio between the first distribution area and the second distribution area (recall that this ratio is the ratio of the number of pixels driven by gamma-1 and number of pixels driven by gamma-2 in Ohi's Fig. 7, which is equal to 1/1) is equal to the distribution area ratio in the block (which is 4 red pixels : 4 pixels in a block or 4/4 = 1).

6. Regarding **claim 16**, Ohi in view of Matsushita, Greier and Ikezaki teach wherein the ratio of the first distribution area per block with the area of the pixels per block (Recall that there are 4 pixels of the same color in a block, e.g. 4 red pixels in Ohi's Fig. 7 as explained for claim 15. This ratio is therefore the number of red pixels driven by gamma-1 in a block of 4 red pixels, or 2/4 in Ohi's Fig. 7) and the ratio of the second distribution area per block with the area of the pixels per block (the number of red pixels driven by gamma-2 in a block of 4 red pixels, or 2/4 in Ohi's Fig. 7) for each pair of gamma-characteristics (recall that each pair is either for red, green or blue) are selected

out of k/(n+1) and (n+1-k)/(n+1), where k is an integer of one to n (where k=2, thus k/(n+1) = (n+1-k)/(n+1) = 2/4).

7. Regarding **claim 23**, Ohi in view of Matsushita, Greier and Ikezaki teach wherein said selecting portion (Ohi, Fig. 6, control 20) selects an output supplied to the display panel (Ohi, Fig. 6, LCD panel) from among the 2n outputs which are gamma-corrected by said converting portion (Ohi, Fig. 6, gamma-1 or gamma-2 for either R or G or B. See also Matsushita Fig. 1), in a pixel made up of a red-pixel, a green-pixel and a blue-pixel (Ohi, col. 6 lines 20-22 and Fig. 7).

8. Regarding **claim 24**, Ohi in view of Matsushita, Greier and Ikezaki teach wherein said selecting portion (Ohi, Fig. 6, control 20) selects an output supplied to the display panel (Ohi, Fig. 6, LCD panel) from among the 2n outputs which are gamma-corrected by said converting portion (Ohi, Fig. 6, gamma-1 or gamma-2 for either R or G or B), for each of a red-pixel, a green- pixel and a blue-pixel comprised by one pixel (Ohi, Fig. 7).

9. Regarding **claim 26**, Ohi teaches a driving method for a matrix-type display apparatus (Figs. 6, 7) which drives a display panel (LCD Panel Fig. 6) including a plurality of pixels (Fig. 7) disposed in matrix form (as shown in Fig. 7) and displays an image (col. 1 lines 11-22), comprising:

a converting step (Fig. 6, elements 14-15) of gamma-converting (Fig. 6, element 15) an input video signal (Fig. 6, RGB input signal 11), using n pairs of gamma-

characteristics which are made up of first and second gamma-characteristics (Fig. 6, elements 14-15, where three pairs are shown, each made of gamma-1 and gamma-2 for each one of R, G and B. Also note Fig. 5 where gamma-1 and gamma-2 are gamma curves i.e. gamma characteristics) different from each other (as shown in Fig. 5), the gamma-characteristics (gamma-1 and gamma-2 of Figs. 5-6) being a transmittance characteristic (col. 5 lines 25-39 and Fig. 2C where the gamma curves gamma-1 and gamma-2 are transmittance characteristics at different angles) according to an input level (Vin of Fig. 5); and

a selecting step (Fig. 6, control 20) of specifying a transmittance (gamma characteristic of col. 5 lines 64-67) to be used for display (col. 5 lines 20-24 where the output voltage used for display of pixels in Figs. 6-7 has a specified [desired] gamma characteristic. Please note that specification of a transmittance, see Fig. 2C, results in a practical specification of a gamma curve according to viewing angle, see Fig. 5 and desired output voltage) based on the input video signal (Vin of Fig. 5 which is an input image signal per col. 4 lines 12-14), selecting one pair of gamma-characteristics (selecting gamma-1 and gamma-2 for either R or G or B in Figs. 6-7) from among the n pairs of gamma-characteristics (three pairs shown in Fig. 6) according to the specified transmittance to be used for display (as explained above, the specified transmittance results in a specified gamma curve and output voltage of Figs. 2C and 5), and selecting an output supplied to the display panel (Fig. 7) from among the 2n outputs which are gamma-corrected in the converting step (where 2n outputs are gamma-1 or gamma-2 for each RGB and Fig. 6 elements 14-15), so that a ratio between a first distribution

area of pixels driven by the video signal gamma-corrected by use of the first gamma-characteristic of the selected pairs of gamma- characteristics (number of pixels driven by gamma-1 for either R or G or B in Fig. 7) and a second distribution area of pixels driven by the video signal gamma- corrected by use of the second gamma-characteristic of the selected pairs of gamma-characteristics (number of pixels driven by gamma-2 for either R or G or B in Fig. 7) is equal to a distribution area ratio specified in advance for the selected pairs of gamma-characteristics (Fig. 7 nth frame or Fig. 6 and col. 6 lines 53-59 referring to the first embodiment where adjacent pixel dots have different use different gamma conversion tables. Thus the ratio of number_of_red_pixels_with_gamma-1 to the number_of_red_pixels_with_gamma-2 is 1/1, and the same applies for green and blue) and with respect to a plurality of division of ranges (col. 5 lines 29-38 where one range is the upper viewing field of 10 degrees, and a different range is the lower field of 10 degrees) each division range being different (+10 degrees or -10 degrees) and set by dividing a range of transmittance to be used for display (col. 5 lines 29-38, the range of transmittance are all degrees of viewing angles in the up and down direction. As evidence that different degrees of viewing angles have different transmittance, the examiner cites Ikezaki's Fig. 7, where different viewing angles have different transmittances. Therefore, when Ohi sets an upper viewing angle of 10 degrees and a lower viewing angle of 10 degrees, inherently Ohi is dividing a range of transmittance per Ikezaki's Fig. 7, and each division range is different as shown in Ikezaki's Fig. 7).

Ohi fails to disclose the n pairs of gamma characteristics being different from each other (Three pairs each of gamma 1 and gamma 2, one pair for each R, G and B. The pairs are the same as shown in Fig. 6), and according to the transmittance to be used for display, a different pair of gamma-characteristics and a different distribution area ratio are used.

However, Matsushita discloses different pairs of gamma characteristics (Matsushita. Fig. 1, three pairs each for a different color: Rγ1 and Rγ2, Gγ1 and Gγ2, Bγ1 and Bγ2. Also see Fig. 11 two pairs for either video or still image: γ1 and γ2, γ1' and γ2'), and according to the transmittance to be used for display, using a different pair of gamma characteristics (Matsushita, Abstract and Figs. 1 and 11. Where the transmittance to be used for display can be interpreted as either the transmittance of either R, G or B in the input signal, and a different pair of gamma characteristic Rγ1 and Rγ2 for red, Gγ1 and Gγ2 for green, Bγ1 and Bγ2 for blue is used as shown in Fig. 1. Or, the transmittance can be interpreted as the transmittance of the input image to be used for the display as either moving image or not, and a different pair of gamma characteristics γ1 and γ2, γ1' and γ2' is used as shown in Fig. 11).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have n pairs of gamma-characteristics being different from each other (as taught by Matsushita in Figs. 1 and 11) and use them according to the transmittance to be used for the display (as taught by Matsushita in Fig. 1, 11 and the abstract) in Ohi's invention, in order to obtain the benefit of further improving the viewing angle depending of the image to be displayed, specifically in the case of moving image

vs. still image where suitable control of each color may be required for better resolution (Matsushita, Abstract).

Still, Ohi in view of Matsushita do not teach using a different distribution area ratio according to the transmittance to be used for display.

Nevertheless, Greier disclose an LCD with improved viewing angle (Greier, para. 2) where some pixels are made brighter and some darker (Greier, para. 82 and Figs. 20-21 where the hatched pixels are dark and the white pixels are bright) and the distribution area ratio adapts to the image content (Greier, para. 85, where the distribution area ratio is the ratio of bright/dark pixels, and it can be e.g. 50% bright, 33% bright and others according to the image content). Thus, it would also have been obvious to one of ordinary skill in the art at the time of the invention, to use different distribution area ratios (as shown in Greier Figs. 20-21, dark vs. bright) according to the transmittance to be used for display (Greier, para. 82 referring to the image content) in order to obtain the benefit of further adapting the pixel data values in such way that the luminance is locally preserved in the image (Greier, para. 82) as regions of the image change (Greier, para. 85).

10. **Claims 17-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohi et al. in US 5,847,688 in view of Matsushita in Japanese Publication JP2003-255908-A, Greier et al. in US 2002/0149598 and Ikezaki et al. in US 5,489,917 as applied above, in further view of Yamashita et al. in US 2001/0026258 (hereinafter Yamashita).

11. Regarding **claim 17**, Ohi in view of Matsushita, Greier and Ikezaki fail to teach a block of one pixel where a first sub-pixel has an area Sa and the second sub-pixels has an area mSa where m>1. However, Yamashita teaches a display wherein a block comprises one pixel (Yamashita, Fig. 1 and para. 41):

each pixel of the display panel is made up of, as one pixel (Yamashita, Fig. 1), of a combination of adjacent sub-pixels with different light transmittances(Yamashita, para. 41), and in doing so, one pixel is formed by a first sub-pixel (Yamashita, Fig. 1, sub-pixel B) which has a first pixel area Sa (as shown) and a second sub-pixel (Yamashita, Fig. 1, sub-pixel A) which has a second pixel area Sb (Yamashita, Fig. 1, sub-pixel A has an area S, which is 4 times greater than the area of sub-pixel B, thus m=4) so the luminance of each sub-pixel is proportional to the area (Yamashita, para. 42).

Thus, it would have been obvious to one of ordinary sill in the art at the time of the invention to use Yamashita's combination of adjacent pixels with different transmittance (Yamashita, para. 41) in Oh in view of Matsushita and Greier display (Ohi, Figs. 6-7), because Ohi already teaches that adjacent pixels have different transmittances (Ohi, Fig. 7, two adjacent sub-pixels of the same color, e.g. red driven by gamma-2 in the third column and first line, and red driven by gamma-1 in the first column and first line. Please note that these sub-pixels are adjacent because the RGB pixels to which they belong are adjacent) and doing such combination would provide the benefit of increased high gray scale display in a color LCD (as taught by Yamashita in para. 67).

Consequently, upon combination, two of Ohi's sub-pixels of the same color driven with different transmittance (Ohi, Fig. 7, e.g. red pixel driven with gamma-1 located at the first column first line and, red pixel driven with gamma-2 located at the third column first line) will form one of Yamashita's pixel of Fig. 1 (e.g. Yamashita sub-pixel A will be driven by gamma-1, and the other sub-pixel, Yamashita sub-pixel B will be driven by gamma-2).

Therefore the selecting portion (Ohi, Fig. 6, control 20) would selects an output supplied to the display panel (Ohi, Fig. 6, LCD panel) from among the 2n outputs which are gamma corrected by said converting portion (Ohi, Fig. 6, six gamma values shown), so that the ratio of the first distribution area and the second distribution area (Recall that in Ohi, this ratio is the ratio of the number of pixels driven by gamma-1 and number of pixels driven by gamma-2 in Fig. 7 for any given color, e.g. red. Upon combination this ratio is the same as Yamashita sub-pixel B to sub-pixel A or 1/4:4/4) is equal to the distribution area ratio in the block (Yamashita Fig. 1, the distribution area ratio can be interpreted as area of sub-pixel B to area of sub-pixel A, or 1/4:4/4).

12. Regarding **claim 18**, Ohi in view of Matsushita, Greier, Ikezaki and Yamashita teach the ratio of the first distribution area with the area of the pixel (Yamashita, Fig. 1, the total area of the pixel is 5/4, thus the ratio of the sub-pixel B with area ¼ is (1/4) / (5/4) = 1/5) and the ratio of the second distribution area with the area of the pixel (Yamashita, Fig. 1, the total area of the pixel is 5/4, thus the ratio of the sub-pixel A with area 1 is (1) / (5/4) = 4/5) for each pair of gamma characteristics are selected out of

1/(m+1) and m/(m+1) (as explained for claim 17, m=4. Then 1/(m+1) = 1/5 and m/(m+1) = 4/5).

13. Regarding **claim 19**, Ohi in view of Matsushita, Greier, Ikezaki and Yamashita teach wherein the second pixel area Sb=4Sa (Yamashita Fig. 1, sub-pixel A with area S and sub-pixel B with area S/4) and that the transmittances are different by varying the pixel area (Yamashita para. 61). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the technology available at hand and set the area of Yamashita's sub-pixel A to meet the relation of 1.5Sa ≤ Sb ≤ 3Sa, as it was already Yamashita's intention to vary the transmittance and luminance of the sub-pixels by altering their area (Yamashita para. 61).

14. Regarding **claim 20**, Ohi in view of Matsushita, Greier and Ikezaki fail to teach one pixel where a first sub-pixel has an area Sa and the second sub-pixels has an area mSa where m>1. However, Yamashita teaches a display wherein:

each pixel of the display panel is made up of, as one pixel (Yamashita, Fig. 4), a first sub-pixel (Yamashita, Fig. 4, sub-pixel R) which has a first pixel area Sa (Yamashita, Fig. 4, area 64 of sub-pixel R) and a second sub-pixel (Yamashita, Fig. 4, sub-pixel G) which has a second pixel area Sb (Yamashita, Fig. 4, area 65 of sub-pixel G, where sub-pixel R area 4 has an area S, which is 4 times greater than the area of sub-pixel G area 65, thus m=4) and that the luminance of each sub-pixel is proportional to the area (Yamashita, para. 42); and

a block comprises two pixels (Yamashita, Fig. 4, a block can be formed by pixel R and pixel G).

Thus, it would have been obvious to one of ordinary sill in the art at the time of the invention to use Yamashita's combination of adjacent pixels with different transmittance (Yamashita, para. 41) in Oh in view of Matsushita and Greier display (Ohi, Figs. 6-7), because Ohi already teaches that adjacent pixels have different transmittances (Ohi, Fig. 7, two adjacent sub-pixels of the same color, e.g. red driven by gamma-2 in the third column and first line, and red driven by gamma-1 in the first column and first line. Please note that these sub-pixels are adjacent because the RGB pixels to which they belong are adjacent) and doing such combination would provide the benefit of increased high gray scale display in a color LCD (as taught by Yamashita in para. 67).

Consequently, upon combination, two of Ohi's sub-pixels of the same color driven with different transmittance (Ohi, Fig. 7, e.g. red pixel driven with gamma-1 located at the first column first line and, red pixel driven with gamma-2 located at the third column first line) will form one of Yamashita's pixel of Fig. 1 (e.g. Yamashita sub-pixel A will be driven by gamma-1, and the other sub-pixel, Yamashita sub-pixel B will be driven by gamma-2).

Therefore the selecting portion (Ohi, Fig. 6, control 20) would selects an output supplied to the display panel (Ohi, Fig. 6, LCD panel) from among the 2n outputs which are gamma corrected by said converting portion (Ohi, Fig. 6, six gamma values shown), so that the ratio of the first distribution area and the second distribution area (Recall that

in Ohi, this ratio is the ratio of the number of pixels driven by gamma-1 and number of pixels driven by gamma-2 in Fig. 7 for any given color, e.g. red. Upon combination this ratio is the same as Yamashita sub-pixel B to sub-pixel A or (1/4) / (4/4) = 1/4) is equal to the distribution area ratio in the block (Yamashita Fig. 1, the distribution area ratio can be interpreted as area of two sub-pixels B to area of two sub-pixels A, or (2*1/4)/(2*4/4) which is equal to 1/4).

15. Regarding **claim 21**, Ohi in view of Matsushita, Greier, Ikezaki and Yamashita teach wherein the ratio of the first distribution area with the area of the block (Yamashita, Figs. 1 and 4, the total area of the block is the area of two pixels in Fig. 4, or 2*5/4, where 5/4 is the area of one pixel of Fig. 1. Thus the ratio of sub-pixels B driven by gamma-1 with total area 2*1/4, is (2*1/4) / (2*5/4) = 1/5) and the ratio of the second distribution area with the area of the block (Yamashita, Fig. 1, the total area of the pixel is 2*5/4, thus the ratio of the sub-pixels A with driven by gamma-2 with total area 2 is (2) / (2*5/4) = 4/5) for each pair of gamma characteristics is (Note that m=4, thus 2+2m=10. Thus the 2/(2+2m)=1/5 and 2m/(2+2m)=4/5, which are the same as the ratios explained above).

16. Regarding **claim 22**, Ohi in view of Matsushita, Greier, Ikezaki and Yamashita teach wherein the second pixel area Sb=4Sa (Yamashita Fig. 1, sub-pixel A with area S and sub-pixel B with area S/4) and that the transmittances are different by varying the pixel area (Yamashita para. 61). Thus, it would have been obvious to one of ordinary

skill in the art at the time of the invention to use the technology available at hand and set the area of Yamashita's sub-pixel A to meet the relation of $1.2Sa \leq Sb \leq 2Sa$, as it was already Yamashita's intention to vary the transmittance and luminance of the sub-pixels by altering their area (Yamashita para. 61).

Response to Arguments

17. Applicant's arguments with respect to claim 14 have been considered but are moot in view of the new ground(s) of rejection.

Please note that the Ohi's teachings in the rejection of claims 14 and 26 have been modified to address the added limitations. Furthermore, evidence reference to Ikezaki et al. in US 5,489,917 was brought into the rejection, to clarify that different ranges of viewing angles inherently disclose different ranges of transmittances.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LILIANA CERULLO whose telephone number is (571)270-5882. The examiner can normally be reached on Monday to Thursday 8AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. C./
Examiner, Art Unit 2629

/Amr Awad/
Supervisory Patent Examiner, Art Unit 2629